

Research Article

ETHNOMEDICINAL STUDY OF PLANTS USED FOR PROTECTION AND STIMULATION OF LIVER IN SOUTHERN WEST BENGAL, INDIA

Shibabrata Pattanayak^{1*}, Tapan Kumar Mandal², Susanta Kumar Bandyopadhyay³

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ABSTRACT: Liver is considered as the main internal organ related with various aspects of digestion and restoration of sound health by many tribal and non tribal rural people of West Bengal, India. Information related with use of various plant parts for protection and stimulation of liver were collected from three southern districts of West Bengal, India with different agro-climatic conditions viz. Paschim Medinipur, Purba Medinipur, and Murshidabad. A total of nineteen plants and combinational use of another three plants are identified and the practiced methods of their uses with dose are documented and with the help of available literatures, the previously reported uses of these medicinal plants are analyzed in that perspective.

Keywords: Medicinal plants, Liver, Protection, West Bengal, India.

INTRODUCTION

In our planet, among almost 250000 higher plant species, around 5000 species have specific therapeutic value (Joy *et al.* 1998). India is one of the world's leading bio-diversity centers with the presence of over 45,000 different plant species (Asthana *et al.* 2012). It is estimated that over 6000 plants in India are in used in traditional, folklore and herbal medicine. The Indian system of medicine has identified almost 1500 medicinal plants of which 500 are

commonly used (Agarwal and Tyagi 2015). Traditionally, ethno medicines are extensively used in India and elsewhere due to their low cost, easy accessibility to everyone and perceived fewer side effects (Rathee *et al.* 2006). According to reports of the World Health Organization, 80% of the world's population relies mainly on traditional therapies, which involve the use of plant extracts or their active substances (WHO 1993). Rural people, especially the ethnic communities of India,

¹Asst. Director, ARD (Microbiology), Institute of Animal Health & Veterinary Biologicals(R&T), 37, Belgachia Road, Kolkata 700037, West Bengal, India.

² Professor, Department of Veterinary Pharmacology & Toxicology, West Bengal University of Animal & Fishery Sciences, 37, Belgachia Road, Kolkata- 700037, West Bengal, India.

³ Director of Medical Education, Government of West Bengal, Swastha Bhavan, Kolkata, West Bengal, India.

* Corresponding author. e-mail: pattanayak1966@gmail.com.

traditionally use the plant resources for their food, shelter and health care. Such knowledge, mostly oral, is passed on to generations and thus appears to be eroding owing to the gradual changes in the life style of these communities. Even after identification of many plants used in Indian system of medicine, a large number of plants or uses of plants are yet to be documented, particularly which are confined among the people of rural areas (Pattanayak *et al.* 2012).

In the present study, attempts are being made to document the plants used as stimulator and protector of liver by the people of southern part of West Bengal, India.

MATERIALS AND METHODS

The present study was performed in three districts of the southern part of West Bengal state of India having different agro-climatic conditions. First one was Paschim Medinipur district, where the soil is mostly sandy lateritic type. A good portion of that district is covered by forest. The inhabitants of that area are mainly of tribal origin (Santhal and Lodha). The representative blocks studied are Gopiballavpur I and Narayangarh. The second district was Purba Medinipur, where the soil is clay-rich, and commonly water lodge in some areas during monsoon. The representative blocks studied are Moyna and Mahisadal. The third district was Murshidabad, which is having mainly new alluvial loamy soil. The representative blocks studied are Raninagar I and Berhampur. The blocks of the concerned districts were selected arbitrarily basing on remoteness, representation of agro-climatic conditions of the districts and uses of different plants as medicine by the people. Name of the villages from where the samples were collected were also documented. The medicinal uses of the plants listed are not

common in every place of the study area. The plant specimens were always collected from an area of its use, though same types of uses were found in some other places of the study areas also.

The investigation was performed by face to face dialogue with the medicine men and medicine women of the study area. Information was collected from both tribal people as well as from non-tribal people of different castes and religions. The knowledge and practice of those people were noted and no modification has been performed during presentation of the information. The plants they use are all locally grown. Samples were collected and branded at local name. Subsequently these were identified by Taxonomist and the specimens were preserved in herbarium. Photographs of areal parts of living plants are added for easy identification of the plants, though some other parts of the plants (like root or stem bark) of some plants are actually used for medicinal purposes.

OBSERVATIONS

The result of the study is described briefly indicating the species of the plants with family, vernacular names, collection number, place of collection along with a brief statement on their medicinal uses as protector or stimulator of liver. Important previous observations were also provided along with proper references. This may help in searching correlation of possible expression of physiological effects of the concerned plant under discussion.

1. *Aegle marmelos* Corr. (F. Rutaceae).

Col No. 37 (PM).

Bengali: Bail, Hindi: Bel, English: Bengal quince.

Collected from: Nayabasan, Gopiballavpur, Paschim Medinipur.

Uses: The ripe fruit of is eaten during the spring and summer months as a protective and stimulatory agent for liver. Partially burned unripe fruit is eaten directly for the same purpose during the months when ripe fruit is not available. A piece of root of this plant is tied with a piece of red cotton thread and kept in touch of the skin of the right forearm of the jaundice patients.

Previous reports: Fruits are used as/in diarrhea, dysentery, gastric troubles, constipation, laxative, tonic, digestive, brain and heart tonic, ulcer, intestinal parasites, gonorrhea, epilepsy (Ohashi *et al.* 1995). Leaves are used to treat diabetes (Maity *et al.* 2015). Leaves are also used in fever along with leaves of *Andrographes paniculata* and rice (Banerjee *et al.* 2016).

Various parts of this plant possess antidiabetic, antiulcer, antioxidant, antimalarial, anti-inflammatory, anticancer, radio-protective, anti-hyperlipidaemic, antifungal, antibacterial, antiviral properties (Patel *et al.* 2012).

2. *Amaranthus spinosus* Lin.

(F. *Amaranthaceae*).

Col. No.11 (M).

Bengali: Kantanotee, Hindi : Kantanutiya, English: Thorny amaranth.

Collected from: Rentua, Gopiballavpur, Paschim Medinipur.

Uses: Root of this plant (1-2 gms) is eaten at alternate days for at least a month as a medicine for malfunctioning of liver. It is taken with pan (*Piper beetle* leaf) or as a drink after making a paste and mixing with water.

Previous reports: It is used to treat as/in digestive upset, bronchitis, appetizer, biliousness, galactagogue, haematinic, stomachic, nausea, flatulence, anorexia, blood diseases, burning sensation, leucorrhoea, leprosy and piles (Rai *et al.* 2014). Used to cure

chronic dysentery (Pattanayak *et al.* 2015c).

The reported pharmacological actions of this plant include antidiabetic, antitumor, analgesic, antimicrobial, anti-inflammatory, spasmolytic, bronchodilator, hepato-protective, spermatogenic, antifertility, antimalarial, antioxidant properties (Rai *et al.* 2014), antipyretic (Srinibas *et al.* 2010), anti-peptic ulcer activity (Ghosh *et al.* 2013).

3. *Andrographes paniculata* Nees. (F. *Acanthaceae*).

Col No. 26 (M).

Bengali: Kalmegh, Hindi: Kirayat, English: Green chirayta.

Collected from: Ramchandrapur, Moyna, Purba Medinipur.

Uses: Small pellets (approximately of 1 gm dry weight) are made with the paste prepared by pressing the leaves of this plant and preserved after drying under sunlight. One pellet is fed at alternate days at the morning for stimulation of liver function. No food or drink is allowed for next one hour.

Previous reports: Traditionally the plant is used for treatment of influenza, dysentery, dyspepsia, malaria, cancer (Okhwarobo *et al.* 2014). In China, India, Thailand, and Malaysia, this plant has been widely used for treating sore throat, flu, and upper respiratory tract infections (Jayakumar *et al.* 2013). Used in fever along with leaves of *Aegle marmelos* and rice (Banerjee *et al.* 2016).

Extracts and pure compounds of the plant have been reported for its efficacy in/for antimicrobial, antiprotozoan, antiinflammatory, antioxidant, antidiabetes, anti-infective, angiogenic, hepato-renal protective, sex hormone modifier, liver enzyme modulation and immunostimulant effects (Okhwarobo *et al.* 2014). Andrographolide, a major bioactive chemical constituent of the plant, has shown

anticancer potential in various investigations (Jayakumar *et al.* 2013).

4. *Azadirachta indica* A. Juss. (F. Meliaceae).

Col No. 36 (PM).

Bengali: Neem, Hindi: Neem, English: Margosa.

Collected from: Romipur, Raninagar 1, Murshidabad.

Uses: The soft, new born leaves of the plant are eaten before lunch after slight frying during the months of December to April. It is believed that it cures problems of liver.

Previous reports: It is used traditionally for skin problems, blood purifying, immunostimulator (Bhowmik *et al.* 2010); leaf has antiulcer effects (Chattopadhyay *et al.* 2004). Leaves are also used in diabetes (Maity *et al.* 2015).

Various parts of this plant have antibacterial, antifungal, anti-inflammatory, anti-tumor and pesticide properties (Mammon *et al.* 2013). The phytochemicals present in neem poses pharmacological effects like antipyretic, antiviral, analgesic, antibacterial, contraceptive hepatoprotective etc. (Nishan and Subramanian 2014).

5. *Bacopa monnieri* (Lin.) H.B.&K. (F. Plantaginaceae).

Col. No. 19 (M).

Bengali: Brahmi Sak, Hindi: Brahmi, English: Thyme-leafed gratiola.

Collected from: Deuli, Narayangarh, Paschim Medinipur.

Uses: 2-3 small plants having 10-15 small leaves and succulent stem are pressed and extract is fed to the children twice or thrice daily as a liver tonic. Alternatively, 4-5 plants fried slightly with ghee is fed.

Previous reports: Traditionally this plant is used as a memory enhancing, anti-

inflammatory, analgesic, antipyretic, sedative and antiepileptic agent (Srivastava *et al.* 2009).

The pharmacological studies showed its central nervous effects (memory enhancement, antidepressant, anxiolytic, anticonvulsant and anti parkinsonian), antioxidant, gastrointestinal, endocrine, antimicrobial, anti-inflammatory, analgesic, cardiovascular and smooth muscle relaxant effects (Al-Snafi 2013).

6. *Cajanus indicus* Spreng. (F. Fabaceae).

Col. No. 3 (M).

Bengali: Arhar, Hindi: Arhar dal, English: Pigeon pea.

Collected from: Bhabta, Berhampur, Murshidabad.

Uses: The juice collected from succulent leaves of the living plant is used for treatment of jaundice patients. 2-3 leaf's extract is fed daily for 10-20 days for that purpose.

Previous reports: Leaf and seed used in anorexia and digestive upset (Pattanayak *et al.* 2015b), used for protection of liver (Pandey 2011). Fruit used to treat diarrhea (Bisht and Dash 2012).

7. *Carica papaya* Lin. (F. Caricaceae).

Col. No. 81 (P).

Bengali: Pepey, Hindi: Papita, English: Papaya.

Collected from: Madhyahingli, Mahisadal, Purba Medinipur.

Uses: The stalk along with a small portion of the green fruit collected from the living plant is cut off to get fresh oozing out latex. It is then added with a little amount of sugar, mixed with water and taken as a medicine of week liver daily at morning for 7-10 days. The green fruit is taken as a curry regularly for at least one month.

Previous reports: It can be used for treatment of diseases like warts, corns, sinuses, eczema, cutaneous tubercles, glandular tumors, blood

pressure, dyspepsia, hyperacidity, dysentery, constipation, amenorrhoea, general debility, expel worms and stimulate reproductive organs. (Arvind *et al.* 2013).

It has anti-inflammatory hypoglycaemic, anti-fertility, abortifacient, hepatoprotective, wound healing, antihypertensive and antitumor activities (Yogiraj *et al.* 2014).

8. *Centella asiatica* (Lin.) Urban. (F. Apiaceae).

Col. No. 16 (P).

Bengali: Thankuni, Hindi: Mandookaparni, English: Marsh pennywort.

Collected from: Ramchandrapur, Moyna, Purba Medinipur.

Uses: As a hepato-protective agent, 4-5 freshly collected leaves or their extract is taken daily at empty stomach for 7-10 days or a curry of about 10 gram of leaves is eaten daily for 10-15 days.

Previous reports: It is used traditionally in asthma, skin disorders, ulcers, body aches, elephantiasis, gastric catarrh, kidney troubles, leprosy, leucorrhoea, urethritis, for improving memory, as a nervine tonic, dropsy, maternal health care and stomach disorders (Singh *et al.* 2010).

It is reported to possess pharmacological activities like antimicrobial activity, anticancer activity, wound healing activity, neuroprotective activity, immunomodulatory activity, anti-inflammatory activity, hepatoprotective activity, insecticidal activity and antioxidant activity (Roy *et al.* 2013).

9. *Cocculus villosus* DC. (F. Menispermaceae).

Synonym: *Cocculus hirsutus*.

Col. No. 34 (PM).

Bengali: Do-doi/Dahi-anthi, Hindi: Faridbuti, English: Broom creeper.

Collected from: Nayabasan, Gopiballavpur, Paschim Medinipur.

Uses: Mature leaves of this plant are collected from living plant and pressed to get extract. The liquid filtrate is mixed with sugar and kept undisturbed for 3-5 minutes to form a green *dahi* (curd) like consistency. It is taken at empty stomach for at least 7 days to stimulate the power of liver.

Previous reports: Traditionally the plant is used in all types of cuts, wounds, boils, gonorrhoea, spermorrhoea, urinary troubles, diarrhea, hyperglycemia, eczema, dysentery, urinary problem, eye diseases, as diuretic and in gout. The leaves of the plant have been evaluated for anti hyperglycemic, antibacterial, diuretic and laxative effects (Meena *et al.* 2014).

The mucilage of this plant contains polysaccharides and a gelatinous type of material which is not absorbed in the G.I.T and passes through the system undigested. The leaves used topically as emollient and demulcent is non-toxic to human skin (Tharun Kumar *et al.* 2012).

10. *Corchorus aestuans* Lin. (F. Malvaceae).

Col. No. 44 (M).

Bengali: Tetopati, Hindi: Banpati, English: Wild Jute.

Collected from: Romipur, Raninagar 1, Murshidabad.

Uses: Clean leaves are preserved after drying. 5-7 dry leaves are kept in a pot with some warm water at night. In the next morning, the aqueous extract of the leaves is fed to the children with weak functioning liver.

Previous reports: It is used as/in stomachic, gonorrhea, urethral discharge, pneumonia (Patel and Patel 2013), anemia, pre-delivery problems of women (Borokini and Omotayo 2012).

The plant is said to possess anticancer, antipyretic, anticonvulsant, stomachic and digitalis glycosides like actions (Patel and Patel 2013).

11. *Curcuma angustifolia* Roxb. (F. Zingiberaceae).

Col. No. 10 (PM).

Bengali: Palo, Hindi: Tikhur, English: East Indian Arrowroot.

Collected from: Belda, Narayangarh, Paschim Medinipur.

Uses: 5-10 gms of grain collected from the roots are mixed with water and fed at empty stomach to protect and stimulate liver.

Previous reports: It is used in gastrointestinal disorders, applied on skin to soothe the painful, inflamed mucous membrane, used as weaning food, to treat stomach ache and curing worm infestation (Sharma 2012). Used in peptic ulcers, dysentery, tuberculosis and bronchitis (Doble *et al.* 2011).

12. *Curcuma longa* Lin. (F. Zingiberaceae).

Col. No. 85 (P).

Bengali: Halud, Hindi: Haldi, English: Turmeric.

Collected from: Asnan, Moyna, Purba Medinipur.

Uses: 2-3 gms of succulent tuber collected from the living plant is eaten after chewing at empty stomach daily as a stimulator and protector of liver function.

Previous reports: Rhizome is useful in the treatment of diabetics, hemorrhoids, anemia, jaundice, cough, asthma, wound healing, colic, gout, renal calculi, poisoning, freckles, skin and neurological disorders (Kirtikar and Basu 1967). Also used in bone fracture (Maity *et al.* 2015).

A wide spectrum of biological activities, like antifungal, antibacterial, antidiabetic, anti-oxidant, anti-allergic, anti-cancer, anti-

inflammatory and anti-protozoal activities are reported by various workers (Bhat *et al.* 2015).

13. *Glinus oppositifolius* Lin. (F. Molluginaceae).

Col. No. 1 (P).

Bengali: Gimesag/Duserasag, Hindi: Jima/Gandhibudi, English: Indian-chickweed.

Collected from: Projabbarh, Moyna, Purba Medinipur .

Uses: Regular eating of the curry made from leaves of this plant is considered as having stimulatory action for liver.

Previous reports: Traditionally this plant is used in the treatment of skin disease, increase appetite, piles, leucoderma, as tonic to intestine, urinary infections, fever, cough, liver problem and also used as antioxidant due to its excellent properties and potent phyto-constituents (Bastaki 2005).

14. *Litsea glutinosa* (Lour) C.B. Robins. (F. Lauraceae).

Col. No. 4 (PM).

Bengali: Piplas/Pipulti, Hindi: Maidalakdi, English: Indian laurel.

Collected from: Chaturibhara, Narayangarh, Paschim Medinipur.

Uses: 3-5 leaves are collected directly from the living tree, washed, pressed, mixed with water, filtered and taken as a drink after mixing with sugar daily at morning as a stimulator of liver.

Previous reports: Leaves are mucilaginous and used as/in antispasmodic, emollient, poultice, diarrhea and dysentery, wounds, bruises (Bhowmik *et al.* 2014), curing of prickly heat, summer itches and *acni* (Pattanayak *et al.* 2012). The leaf extract shows antibacterial and cardiovascular activities. The oil extracted from berries to use in rheumatism (Bhowmik *et al.* 2014).

The bark is considered to be capable of

relieving pain, arousing sexual power and also producing a soothing effect on the body, good for the stomach and are considered to be mildly astringent, used in diarrhea and dysentery. The methanolic extract of the bark showed antibacterial activity (Lohitha *et al.* 2010).

15. *Oxalis corniculata* Lin. (F. Oxalidaceae).

Col. No. 67 (M).

Bengali: Amrul Shak, Hindi: Amrul, English: Creeping wood sorrel.

Collected from: Romipur, Raninagar 1, Murshidabad.

Uses: Juice of 5-7 gms freshly collected leaves is taken regularly to restore liver function after curing from any disease. Occasional eating of the curry of 10 - 20 gms of leaves is recommended for restoration of proper functioning of liver.

Previous reports: It is used traditionally in/ as appetizer, anemia, wounds, burns, sprains, cancer, piles, skin eruptions, influenza, fever, urinary tract infection, diarrhea and snake bites (Kathiriya *et al.* 2010). It is a good source of vitamin C, niacin and beta carotene. It acts as antibacterial, antifungal, antimicrobial, anticancer, anti-diabetic, anti-inflammatory, astringent, depurative, diuretic agent (Kataki and Saikia 2015).

16. *Paederia foetida* Lin. (F. Rubiaceae).

Col. No. 83 (M).

Bengali: Gandal/Gandha-bhadulia, Hindi: Gandhaprasarini, English: Stinkvine/Chinese flower plant.

Collected from: Jhautala, Mahisadal, Purba Medinipur.

Uses: Occasional eating of a curry prepared with 5-10 grams of leaves is advocated for the persons having improper functioning liver.

Previous reports: The aqueous paste of this plant is traditionally used for treatment of

rheumatoid arthritis, hepatic disorders, piles, diabetes, asthma, coughs, body ache, itches, wounds, stomach-ache, diarrhea, dysentery, flatulency and toothache. It is having antibacterial cytotoxic, anthelmintic, antihyperglycemic, hepato-protective, anti-fungal, anti-ulcer, antioxidative, and anti-diarrhoeal effects (Senapati *et al.* 2013).

17. *Phyllanthus amarus* Lin. (F. Phyllanthaceae).

Col. No. 16 (PM).

Bengali: Bari amla, Hindi: Bhuiamonla, English: Carry me seed.

Collected from: Rantua, Gopiballavpur, Paschim Medinipur.

Uses: To stimulate the liver for proper functioning, root (1-2 gms) freshly collected from the living plant is fed to the patients either as a paste or with a piece of pan leaf (*Piper betle*).

Previous reports: It is used in diarrhea, dysentery, dropsy, colic, jaundice, intermittent fever, pain, urogenital disorders, kidney and urinary bladder problems, diabetes, gonorrhea, scabies and various skin problems, wounds. The root extract is used to cure stomach pain (Verma *et al.* 2014).

18. *Tamarindus indica* Lin. (F. Caesalpiniaceae).

Col. No. 51 (P).

Bengali: Tentul, Hindi: Imli, English: Tamarind.

Collected from: Ramchandrapur, Moyna, Purba Medinipur.

Uses: The fruit pulp is kept in a covered earthen pot for at least three years with occasional sunlight treatment so that a portion of it becomes liquid. 2- 3 ml of that liquid pulp is fed regularly with principal day meal to cure all types of problems of liver.

Previous reports: It is used as/in laxative,



1. *Aegle marmelos*



2. *Amaranthus spinosus*



3. *Andrographis paniculata*



4. *Azadirachta indica*



5. *Bacopa monnieri*



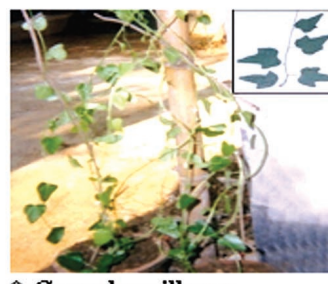
6. *Cajanus indicus*



7. *Carica papaya*



8. *Centella asiatica*



9. *Cocculus villosus*



10. *Corchorus aestuans*



11. *Curcuma angustifolia*



12. *Curcuma longa*

Fig.1a: Plants used for protection and stimulation of liver in southern West Bengal, India.



13. *Glinus oppositifolius*



14. *Litsea glutinosa*



15. *Oxalis corniculata*



16. *Paederia foetida*



17. *Phyllanthus amarus*



18. *Tamarindus indica*



19. *Tinospora cordifolia*



20 A. *Syzygium cumini*



20 B. *Terminalia arjuna*



20 C. *Acacia nilotica*

Fig.1b: Plants used for protection and stimulation of liver in southern West Bengal, India.

abdominal pain, diarrhea and dysentery, peptic ulcer, spasmolytic, cancer, antimicrobial, antiparasitic, antifungal, antiviral, antinematodal, anti-inflammatory, antioxidant, anti-diabetic, liver protective, cardiovascular protective, wound healing (Pinar Kuru 2014). Used in Unani system as demulscent, cardiac tonic, stomachic, carminative, digestive, laxative, antiscorbutic, antibilious and antiseptic (Tariq *et al.* 2013). Root of baby plant is used as inducer of abortion (Pattanayak *et al.* 2016).

19. *Tinospora cordifolia* (Willd) Hook. F. Thoms. (F. Menispermaceae).

Col. No. 81(M).

Bengali: Gulancha, Hindi: Guduchi, English: Tynospora.

Collected from: Tenka Raipur, Raninagar, Murshidabad.

Uses: The stem of this plant is cut into pieces (1-2 gms) and fed to the patients daily along with a piece of pan (*Piper betle*) to cure malfunctioning liver and stimulation of its action. The collected stem is not used beyond three days after collection.

Previous reports: This plant can be used as an immunomodulatory or immunostimulatory, antitumor, cognition, antiinflammatory, anti-neoplastic, antihyperglycemia, antihyperlipidemia, antioxidant, antituberculosis, gastrointestinal and hepatoprotection, anti-osteoporotic, anti-angiogenic, anti-malarial, anti-allergic and side effects prevention of the cancer chemotherapy (Pandey *et al.* 2012). Flower and root of this plant is used to get relief from headache (Maity *et al.* 2015).

20. Combinational Use of three plants

Three plants [*Syzygium cuminii* (Lin.) Skeels., *Terminalia arjuna* (Roxb.) Wight &

Arn. and *Acacia nilotica* (Lin.) Delile.] are used in combination for that purpose.

Combinational Use: Approximately 10 gms of bark is collected from each tree, the outer scaly rough portion is taken off and are pressed together to some extent and kept in hot water at night. Extract of it is taken out by manual pressing of the material at the next morning and given to the patients to drink to cure chronic malfunctioning of liver. The treatment is continued for three consecutive days each week for one month.

20 A. *Syzygium cuminii* (Lin.) Skeels. (F. Myrtaceae).

Col. No. 89 (P).

Bengali: Kalojam, Hindi: Jamun, English: Jambul.

Collected from: Nayabasan, Gopiballavpur, PaschimMedinipur.

Previous reports: The bark of this plant is used as/in astringent, refrigerant, carminative, diuretic, digestive, anthelmintic, febrifuge, constipating, stomachic and antibacterial (Saravanan and Pari 2008). Leaves used in diabetes (Maity *et al.* 2015).

20 B. *Terminalia arjuna* (Roxb.) Wight & Arn. (F. Combretaceae).

Col. No. 88 (MP).

Bengali: Arjun, Hindi: Arjun, English: Arjun tree.

Collected from: Nayabasan, Gopiballavpur, Paschim Medinipur.

Previous reports: The bark of this tree has been used in cardiac disorders in Ayurveda (Seth *et al.* 2013). The bark is used for treatment of angina and heart disease, relieving excessive menstrual bleeding, leucorrhea, diarrhea, dysentery, tubercular cough, asthma, earache, cleansing sores, ulcers and syphilitic infection, skin disorder (Chandankumar *et al.* 2013). The

preclinical studies in modern medicine suggest that there are strong antioxidant properties of *Terminalia arjuna* and reduction of ischemic perfusion injury. It also causes attenuation of oxidative stress and antifibrotic activity (Seth *et al.* 2013).

20 C. *Acacia nilotica* (Lin.) Delile. (F. Fabaceae).

Col. No. 41(P).

Bengali: Babla/Babul, Hindi: Babhul, English: Babul tree.

Collected from: Uttampur, Moyna, Purba Medinipur.

Previous reports: Various parts of this plant is used as/in anti-cancer, anti tumours, antiscorbutic, astringent, anti-oxidant, natriuretic, antispasmodial, diuretic, Intestinal pains and diarrhea, nerve stimulant, cold, congestion, coughs, dysentery, fever, hemorrhages, leucorrhea, ophthalmia and sclerosis (Saini 2008).

The leaves and pods are an excellent fodder with anti inflammatory properties, rich in protein. The pods have molluscicidal and algicidal properties (Malviya *et al.* 2011). The immature leaf buds are eaten as a remedy of chronic flatulence (Pattanayak *et al.* 2015a). The leaves are also used as gargle for sore throat, tonic to liver, enriches blood (Manoj Kumar 2015).

DISCUSSION

It is a common tendency of rural people of the study area to consider almost all types of chronic health problems related somehow with improper functioning of liver. So, the rural people are accustomed with the use of many locally available plants as a stimulator and curative agent for liver. This concept of the

common people and not the concept of modern medicine was followed during documentation of the data.

Among the twenty two plants documented (Fig. 1a and Fig. 1b), succulent leaf or leaf extracts of eight plants; watery extract of dry leaf of one plant; root or root extracts of four plants; fruit of three plants; stem of one plant; leaf and stem together of two plants are reported for their use. The combinational uses of watery extract of bark of three plants are also reported. Except *Tamarindus indica*, *Curcuma angustifolia* and *Corchorus aestuans*, all the plant parts are used at succulent condition on the day or within a few days of collection.

Use of hepato-protective plants is a very ancient practice. Pattanayak *et al.* (2013) enlisted use of twenty one plants for hepato-protective activity. Among these, only six plants (*Andrographis paniculata*, *Azadirachta indica*, *Centella asiatica*., *Phyllanthus amarus*, *Tinospora cordifolia* and *Curcuma longa*) are common with the present study.

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